Case Study: Two Component Injection Moulding with Core-Back Process and Automation

APPLICATION

In this 2 component injection moulding (IM) application, Comtec IPE evaluated and documented specific areas for improvement with the client. The proposal included a complete, Turn-key solution with products from “best in class” technology partners.

Part/Material Description: Polycarbonate base cover plate medical device with anti-vibration rubber strip to stop movement of the device and reduce vibration noise.

Material 1: PC/ABS 124mm x 123mm x 2mm / part weight 15.2ccm
Material 2: TPE 66mm x 5.6mm x 2mm / part weight 4ccm

PROCESSING REQUIREMENTS / CHALLENGES

• Replace four Standard IM Machines with one Multi Component IM Machine
• Replace four Single Cavity Standard Injection Moulds with one Two Cavity Multi Component Injection Mould
• Over-mould TPE strip onto rigid PC component using a core-back process
• Regulate the temperatures of the mould steel for both PC/ABS and TPE materials
• Automate part removal, stack parts on the conveyor, palletize and index
• Improve cycle time by 20%
• Reduce factory foot print by 50%
• Reduce energy consumption by 30%
• Provide unmanned operation for minimum 4 hours

ADVANTAGES

• Parts can be produced without the need for intermediate opening of the mould and without further transport of the pre-moulded part.
• Simple, cost-effective mould technology
• Core pulls, which are freely programmable via the SELOGICA system, ensure a reliable process sequence.
• Compact tool size

COMTEC IPE SOLUTION

Comtec IPE certified technicians installed, tested and integrated a successful manufacturing cell meeting the processing requirements and challenges noted previously. Ongoing technical support is included to ensure an optimised process with high up-time. The integrated manufacturing system solution included the following equipment:

Machine: Arburg ALLROUNDER 570 S 2200-400/70
2nd injection unit on the non-operator side
Robotic System: Arburg MULTILIFT V, servo electro performance with vertical part removal
Control System: Arburg SELOGICA control system makes the connection between the Arburg robotic system and the ALLROUNDER simple, reliable and universal
Removal Module: Suction device frame with 2 suction units per cavity
Frame is easy to convert for alternative moulds
Conveyor System: Parts stacked into 4 rows x 10 high, indexed via light beam
Light sensor at the end of the conveyor alarms when conveyor is full
Injection Mould: Two cavity core-back for 2nd component
Mold-Masters hot runner system
Stäubli RPL water fittings
HB-THERM Series 5 water regulators for temperature control

CORE BACK PROCESS

During the core-back process, the cavity is extended by pulling a slide and a second component injected. The sequential cycle is especially suitable for mould parts with simple geometries.

By shifting the cores or sliders inside the mould as part of the composite injection moulding process, hollow spaces can first be closed off and subsequently reopened (see illustration).

1- The concern for this application was processing two different material types (PC/ABS + TPE). Analysis showed that the temperature variation of the plastics were within the limits of the core-back process, but required the use of high quality regulation of the water circuits for control.

2- The 2nd injection unit mounted horizontally to the non-operator side for enhanced access to the barrel also enabling automation with the ARBURG Multilift V robot.